

REMARKS/ARGUMENTS

Claim 1 has been amended to reflect that the gas mixture comprises predominantly oxygen but substantially no argon, the linear ion source generates a collimated beam of ions, and the soiling matter is cleaned from the substrate without removing material from the surface. No new matter has been added through these amendments, support for which exists throughout the present specification such as, for example, at page 4, line 11 through page 5, line 3; page 10, lines 16-20; and page 11, lines 6-25.

The dependency of claim 21 has been changed.

The remaining claims have been amended as appropriate to place them into better condition for examination.

Claims 1-29 are currently pending, although claims 11-19 and 24-29 have been withdrawn from consideration. Upon indication of allowable subject matter, Applicants currently intend to seek appropriate rejoinder of the withdrawn claims, all of which ultimately depend from claim 1. See, MPEP 821.04.

The Office Action rejected claim 21 under 35 U.S.C. §112, second paragraph, as being indefinite, asserting that an insufficient antecedent basis for “the cathode sputtering process” existed. In view of the above amendment to claim 21, Applicants respectfully submit that this rejection has been rendered moot, and that the rejection should be reconsidered and withdrawn.

The Office Action also rejected claims 1, 2, 5-7, 9, 10 and 20 under 35 U.S.C. §103 as obvious over U.S. patent application publication no. 2004/0020761 (“Thomsen 761”) in view of U.S. patent application publication no. 2003/0064198 (“Thomsen 198”); claims 8, 22 and 23 under 35 U.S.C. §103 as obvious over Thomsen 761, Thomsen 198, and U.S. patent application publication no. 2002/0117250 (“Veerasamy”); claims 3 and 21 under 35 U.S.C. §103 as obvious over Thomsen 761, Thomsen 198, and U.S. patent 4,891,113 (“Criss”); and

claim 4 under 35 U.S.C. §103 as obvious over Thomsen 761, Thomsen 198, and U.S. patent application publication no. 2004/0163945 (“Hartig”). In view of the following comments, Applicants respectfully request reconsideration and withdrawal of these rejections.

The invention methods relate to cleaning a substrate using a gas mixture comprising predominantly oxygen but little or no argon, where the linear ionic source is operating according to the collimated mode, and the process is operated such that the surface is cleaned but left intact (without etching or milling). The applied art neither teaches nor suggests these invention methods.

Thomsen 761 relates to depositing a DLC layer using an ionic source. It does not relate to a cleaning process without removing material from the surface. Further, as noted at page 5, par. 12 of the Office Action, Thomsen 761 relates to processes in an argon atmosphere. (See, par. [0038]). The drawbacks and deficiencies of such processes are detailed at pages 4-5 of the present specification, including contaminants during sputtering, formation of insulation/barrier layers, and/or alteration of the chemical make up of the uppermost surface. Thus, Thomsen 761 relates to different processes than those claimed in the present application -- Thomsen 761 does not teach or suggest cleaning processes of the present invention including lack of material removal from the surface, and exclusion of substantially all argon from the process.

Thomsen 198 primarily relates to using ionic sources for “milling” the substrate. It does not enable one of ordinary skill in the art to clean a substrate without removing material from the substrate as required by the present invention. Further, Thomsen 198 does not teach or suggest using a gas mixture comprising predominantly oxygen and substantially no argon. In fact, Thomsen 198 actually teaches away from such gaseous mixtures, leading one of ordinary skill in the art to use mixtures having substantial amounts of both oxygen and argon. For example, in pars. [0045] and [0054], Thomsen 198 indicates that oxygen and argon are

complimentary and must be used together, indicating that argon ions “mill” the substrate. Thus, Thomsen 198 indicates that argon should be used to “mill” the surface, necessarily meaning that it cannot teach or suggest processes in which argon is substantially absent and no such milling (or material removal) occurs. Nowhere does Thomsen 198 teach or suggest that oxygen could be used with little or no argon, or that “cleaning” should occur without milling.

Moreover, par. [0045] of Thomsen 198 makes clear that those processes are run in diffuse mode. In stark contrast, the invention methods are run in collimated mode. Indeed, the present invention relates in part to the discovery that when cleaning processes without removal of material occurs, a collimated beam is necessary. (See, for example, pages 13 and 14 of the present specification, particularly the top of page 14). Thus, Thomsen 198 which relates to diffuse mode cannot teach or suggest the present invention.

The tertiary references, Veerasamy, Criss, and Hartig, cannot compensate for the fatal deficiencies discussed above in connection with the Thomsen references. These references are merely cited for their disclosures relating to ion energy, magnetically enhanced cathode sputtering, and thin film formation, respectively. None of these applied tertiary references would motivate one of ordinary skill in the art to modify the disclosures in the Thomsen references, or to practice methods contrary to the Thomsen disclosures, such that processes are run in the presence of oxygen (to the exclusion of substantially all argon) using a collimated beam to clean without material removal (etching, etc.). It is only using the present specification as a guide, using improper hindsight, that the present invention can be cobbled together from the disparate teachings of the applied art. Under such circumstances, the pending obviousness rejections are improper, and should be reconsidered and withdrawn.

In view of the above, Applicants respectfully request reconsideration and withdrawal of the rejections under 35 U.S.C. §103.

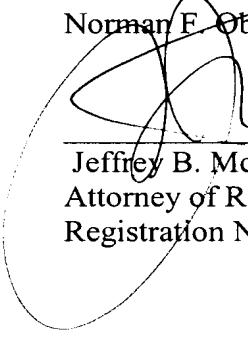
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Applicants believe that the present application is in condition for allowance. Prompt and favorable consideration is earnestly solicited.

Respectfully submitted,

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